

this reference. In this regard, microactuator 13 is formed on a planar substrate 41 and has a movable structure 42, which includes a mirror holder 43, that overlies substrate 41 (see FIGS. 3 and 4). At least one and as shown a plurality of first and second comb drive assemblies 46 and 47 are carried by substrate 41 for preferably rotating movable structure 42 in first and second opposite directions about an axis of rotation 48 extending perpendicular to planar substrate 41. The axis of rotation is shown as a point in FIG. 3 and labeled by reference line 48. Each of the first and second comb drive assemblies 46 and 47 includes a first drive member or comb drive member 51 mounted on substrate 41 and a second drive member or comb drive member 52 overlying the substrate. The movable structure 42 of rotary microactuator 13 includes second comb drives 52 and is supported or suspended above substrate 41 by first and second spaced-apart springs 43 and 44.--

The paragraph beginning on Page 9, line 31 of the application should be replaced with the following rewritten paragraph:

--Each of stationary and movable comb drive fingers 67 and 72 is optionally inclined relative to respective bars 66 and 71. That, is each such comb finger is joined to its respective bar at an oblique angle, as disclosed in U.S. Patent No. 6,333,584, as opposed to a right angle. The inclination angle at which each comb drive finger 67 and 72 is joined to its respective bar 66 and 71, measured from a line extending normal to the bar, can range from zero to five degrees and is preferably approximately three degrees. Each movable comb drive finger 72 is further optionally offset relative to the midpoint between the adjacent pair of stationary comb drive fingers 67 between which such movable comb drive finger interdigitates when the second comb drive 52 is electrostatically attracted to the first comb drive 51, also as disclosed in U.S. Patent No. 6,333,584. When each movable comb drive finger 72 moves to its second position between the adjacent pair of stationary comb drive fingers 67, the movable comb drive finger becomes centered relative to the midpoint between the adjacent pair of stationary comb drive fingers 67. The offset and inclination of stationary and movable comb drive fingers 67 and 72 serves to accommodate the slight radially-inward shift of the movable comb drive 52, resulting from the deflection and foreshortening of first and second springs 53 and 54, when movable structure 42 moves from its first position in which

springs 53 and 54 are in a straightened position, as shown in FIG. 3, to its second position in which springs 53 and 54 are bent or deflected.--

The paragraph beginning on Page 11, line 15 of the application should be replaced with the following rewritten paragraph:

-- The optical microswitch of package 9 is similar to the optical microswitch disclosed in U.S. Patent No. 6,329,737. In this regard, a micromachined mirror 96 is coupled to microactuator 13 and extends out of the plane of the microactuator. More specifically, micromirror 96 is secured to microactuator 13 by a post preferably formed integral with the mirror 96 and micromachined separately from microactuator 13. The post is joined at its base to mirror holder 43 by any suitable means such as an adhesive. Micromirror 96 has a reflective face or surface 97 and is rotatable by microactuator 13 about axis of rotation 48.--

The paragraph beginning on Page 14, line 10 of the application should be replaced with the following rewritten paragraph:

--Once package 9 is plugged into place or otherwise mounted into a suitable optical system, for example adjacent the ends of one or more optical fibers in a telecommunication system, and electrically coupled by means of pins 36 to a suitable controller and voltage generator 86, the package 9 can be used for switching laser light between the one or more optical fibers in the manner disclosed in U.S. Patent No. 6,301,403, the entire content of which is incorporated herein by this reference. As part of this operation, mirror holder 43 can be rotated in opposite first and second directions of travel about axis of rotation 48 by controller 86. Suitable voltage potentials to first and second drive electrodes 88 and 89 can range from 20 to 250 volts and preferably range from 60 to 180 volts. Microactuator 13 is capable of +/- six degrees of angular rotation, that is a rotation of six degrees in both the clockwise and counterclockwise directions for an aggregate rotation of twelve degrees, when such drive voltages are utilized. Mirror holder 43, and thus micromirror 96, can be stopped and held at any location in such range of motion.--

The paragraph beginning on Page 16, line 15 of the application should be replaced with the following rewritten paragraph:

--Although the fluid-damped microactuator of the present invention has been shown as being part of an optical microswitch, it should be appreciated that a fluid-damped microactuator can be provided in a variety of other optical components. Further, a fluid-damped microactuator of the present invention can be utilized in other than telecommunications systems. For example, such microactuators can be utilized in data storage systems, for example magneto optical data storage systems. It should also be appreciated that the drag-inducing members of the present invention can be used in undamped microactuators, for example microactuators or other microdevices operated in air. The damping techniques disclosed herein can be used in combination with the damping techniques disclosed in U.S. patent application Serial No. 09/876,265 filed June 6, 2001, the entire content of which is incorporated herein by this reference. In addition, the damping fluids hereof can also be used with devices other than actuators.--

IN THE CLAIMS

Amend the following claims to read:

1. (Amended) A damped micromechanical device for use with a laser beam comprising a housing provided with an internal fluid-tight chamber, an electrically-driven microactuator disposed in the fluid-tight chamber and having a movable structure capable of being moved between first and second positions at a resonant frequency, a damping fluid disposed in the fluid-tight chamber for damping the movement of the movable structure at the resonant frequency and an optical element carried by the movable structure and disposed in the damping fluid for receiving the laser beam.

2. (Amended) The device of Claim 1 wherein the damping fluid has a viscosity greater than the viscosity of air for reducing inertial forces on the movable structure due to the buoyancy of the movable structure in the damping fluid.

16. (Amended) A damped micromechanical device comprising a housing provided with an internal fluid-tight chamber, an electrostatic microactuator disposed in the fluid-tight chamber, the electrostatic microactuator having a first comb drive member with first comb drive fingers mounted on a substrate and a second comb drive member with second comb drive fingers overlying the substrate and carried by the substrate, the second comb drive member capable of

being moved at a resonant frequency between a first stationary position in which the second comb drive fingers are not substantially interdigitated with the first comb drive fingers and a second stationary position in which the second comb drive fingers are substantially interdigitated with the first comb drive fingers and a dielectric liquid disposed in the fluid-tight chamber for damping the movement of the second comb drive member at the resonant frequency and enhancing the electrostatic force between the second comb drive fingers and the first comb drive fingers.

17. (Amended) The device of Claim 16 wherein the microactuator includes at least one spring member having a first end portion coupled to the substrate and a second end portion coupled to the second comb drive member.

18. (Amended) The device of Claim 16 wherein the first and second comb drive members each have a length ranging from 200 to 2000 microns.

Add the following claims:

--20. The device of Claim 16 further comprising a controller coupled to the first and second comb drive members for closed loop control of the microactuator.

21. A damped micromechanical device comprising a housing provided with an internal fluid-tight chamber, a comb assembly disposed in the fluid-tight chamber and having a first comb member mounted on a substrate and a second comb member overlying the substrate and carried by the substrate, the second comb member being movable between first and second positions relative to the first comb member and a fluid denser than air disposed in the fluid-tight chamber for damping the movement of the second comb member, the housing having a sealable fill hole for introducing the fluid into the fluid-tight chamber.

22. The device of Claim 21 wherein the comb assembly is a comb drive assembly of a microactuator disposed in the fluid-tight chamber.

23. The device of Claim 21 wherein the housing is made of ceramic.

24. The device of Claim 21 for use with a laser beam further comprising an optical element carried by the second comb member within the fluid-tight chamber for receiving the laser beam.

25. The device of Claim 21 for use with a laser beam wherein the housing is provided with a window for permitting passage of the laser beam into the fluid-tight chamber.

26. The device of Claim 21 wherein the fluid is a liquid.